

Description

The AP2N7002BI uses advanced trench technology to provide excellent $R_{DS(ON)}$, low gate charge and operation with gate voltages as low as 4.5V. This device is suitable for use as a Battery protection or in other Switching application.

General Features

$V_{DS}=60V$ $I_D=0.35A$

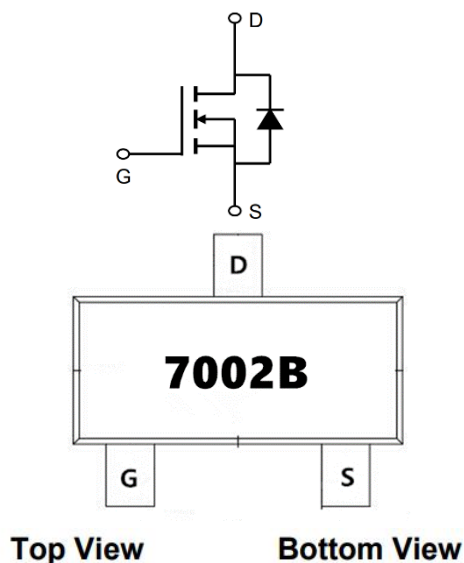
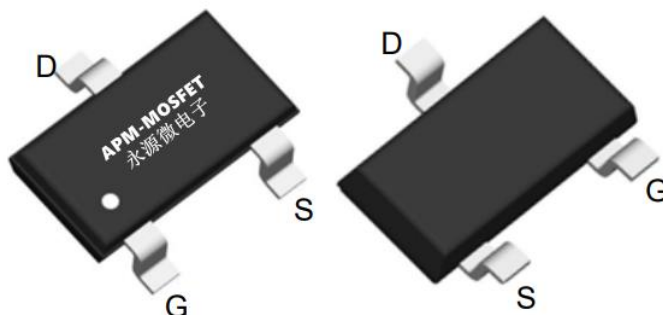
$R_{DS(ON)} < 2200m\Omega$ @ $V_{GS}=10V$ (Type: 1700m Ω)

ESD Rating: HBM $\geq 2000V$

Application

Load switch

Uninterruptible power supply



Package Marking and Ordering Information

Product ID	Pack	Marking	Qty(PCS)
AP2N7002BI	SOT23L	7002B	3000

Absolute Maximum Ratings ($T_C=25^{\circ}C$ unless otherwise noted)

Symbol	Parameter	Value	Unit
V_{DS}	Drain-Source Voltage	60	V
V_{GS}	Gate-Source Voltage	± 20	V
$I_D@T_C=25^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V ¹	0.35	A
$I_D@T_C=100^{\circ}C$	Continuous Drain Current, V_{GS} @ 10V ¹	0.10	A
I_{DM}	Pulsed Drain Current ²	1.2	A
$P_D@T_C=25^{\circ}C$	Total Power Dissipation ⁴	0.35	mW
T_{STG}	Storage Temperature Range	-55 to 150	$^{\circ}C$
T_J	Operating Junction Temperature Range	-55 to 150	$^{\circ}C$
$R_{\theta JA}$	Thermal Resistance Junction-ambient ¹	357	$^{\circ}C/W$

60V N-Channel Enhancement Mode MOSFET
Electrical Characteristics ($T_A=25^{\circ}\text{C}$ unless otherwise noted)

Symbol	Parameter	Test Condition	Min.	Typ.	Max.	Unit
$V_{(BR)DSS}$	Drain-Source Breakdown Voltage	$V_{GS}=0V, I_D=250\mu A$	60	-	-	V
I_{DSS}	Zero Gate Voltage Drain Current	$V_{DS}=60V, V_{GS}=0V,$	-	-	1	μA
I_{GSS}	Gate to Body Leakage Current	$V_{DS}=0V, V_{GS}=\pm 20V$	-	-	± 10	μA
$V_{GS(th)}$	Gate Threshold Voltage	$V_{DS}=V_{GS}, I_D=250\mu A$	1	1.5	2.5	V
$R_{DS(on)}$	Static Drain-Source on-Resistance	$V_{GS}=10V, I_D=0.3A$	-	1700	2200	m Ω
		$V_{GS}=4.5V, I_D=0.2A$	-	2100	2800	
C_{iss}	Input Capacitance	$V_{DS}=25V, V_{GS}=0V,$ $f=1.0MHz$	-	28	-	pF
C_{oss}	Output Capacitance		-	11	-	pF
C_{rss}	Reverse Transfer Capacitance		-	4	-	pF
Q_g	Total Gate Charge	$V_{DS}=10V, I_D=0.3A,$ $V_{GS}=4.5V$	-	1.7	-	nC
Q_{gs}	Gate-Source Charge		-	0.3	-	nC
Q_{gd}	Gate-Drain("Miller") Charge		-	0.6	-	nC
$t_{d(on)}$	Turn-on Delay Time	$V_{DD}=10V, I_D=0.2A,$ $R_{GEN}=10\Omega, V_{GS}=10V,$	-	2	-	ns
t_r	Turn-on Rise Time		-	15	-	ns
$t_{d(off)}$	Turn-off Delay Time		-	7	-	ns
t_f	Turn-off Fall Time		-	20	-	ns
I_S	Maximum Continuous Drain to Source Diode Forward Current		-	-	0.3	A
I_{SM}	Maximum Pulsed Drain to Source Diode Forward Current		-	-	1.2	A
V_{SD}	Drain to Source Diode Forward Voltage	$V_{GS}=0V, I_S=0.3A$	-	-	1.2	V

Note :

- 1、The data tested by surface mounted on a 1 inch 2 FR-4 board with 2OZ copper.
- 2、The data tested by pulsed , pulse width $\leq 300\mu s$, duty cycle $\leq 2\%$
- 3、The power dissipation is limited by 150°C junction temperature
- 4、The data is theoretically the same as I_D and I_{DM} , in real applications , should be limited by total power dissipation.

Typical Characteristics

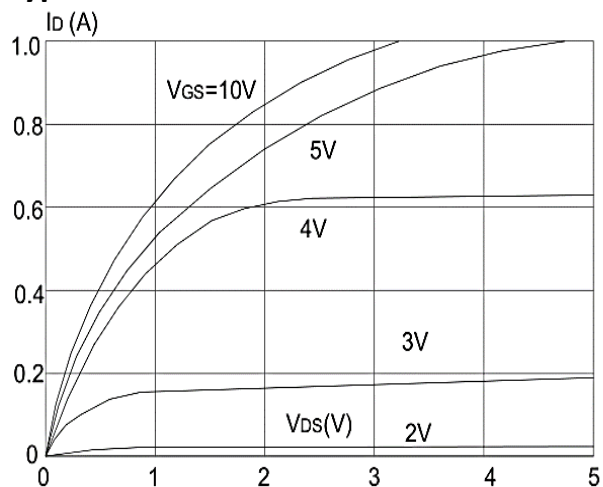


Figure1: Output Characteristics

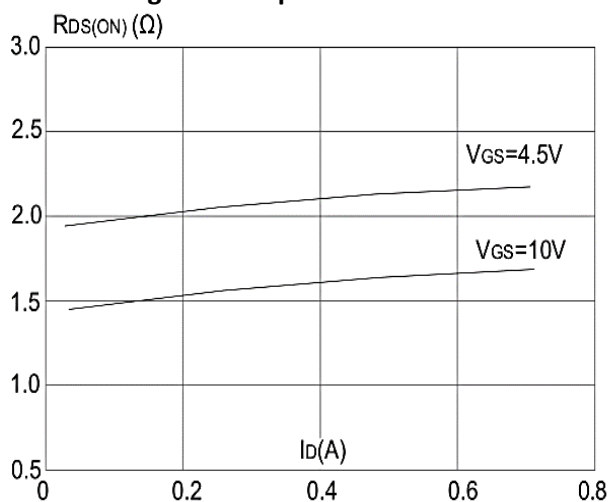


Figure 3: On-resistance vs. Drain Current

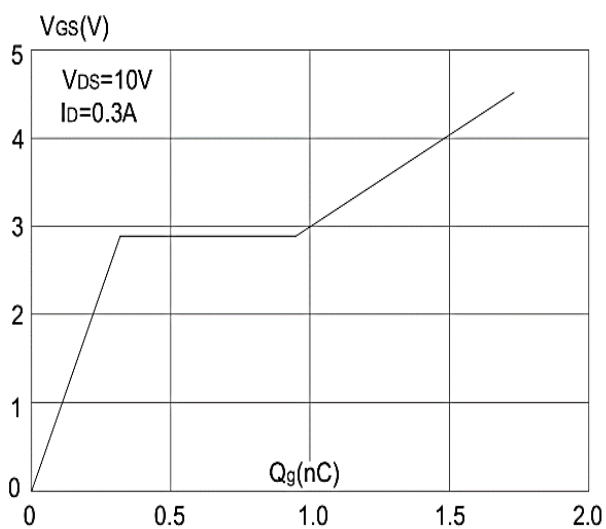


Figure 5: Gate Charge Characteristics

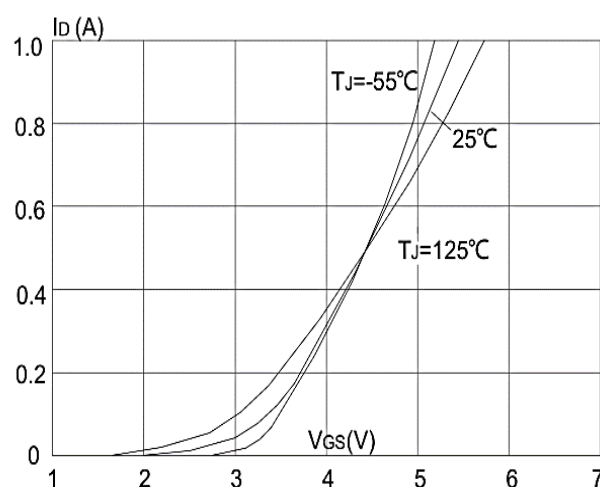


Figure 2: Typical Transfer Characteristics

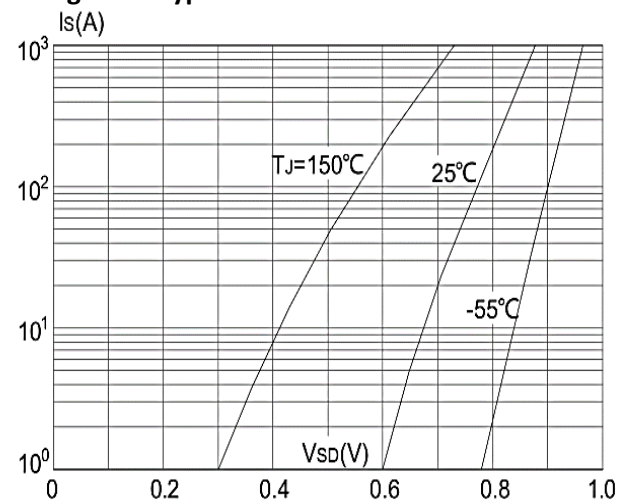


Figure 4: Body Diode Characteristics

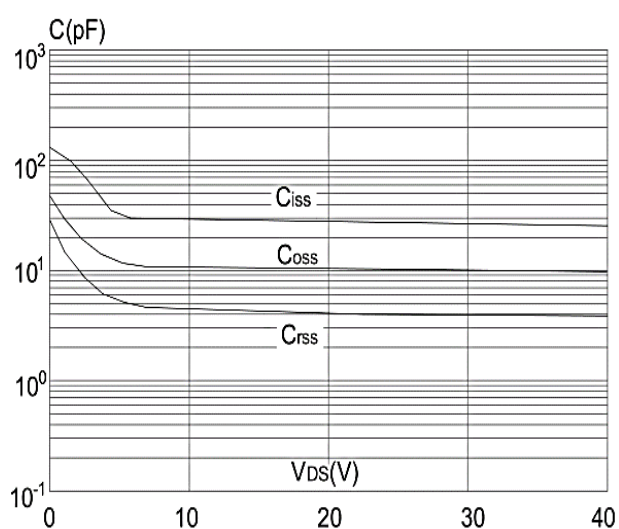


Figure 6: Capacitance Characteristics

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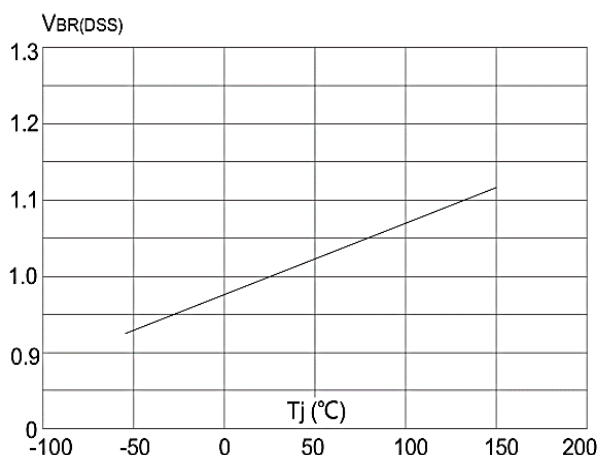


Figure 7: Normalized Breakdown Voltage vs. Junction Temperature

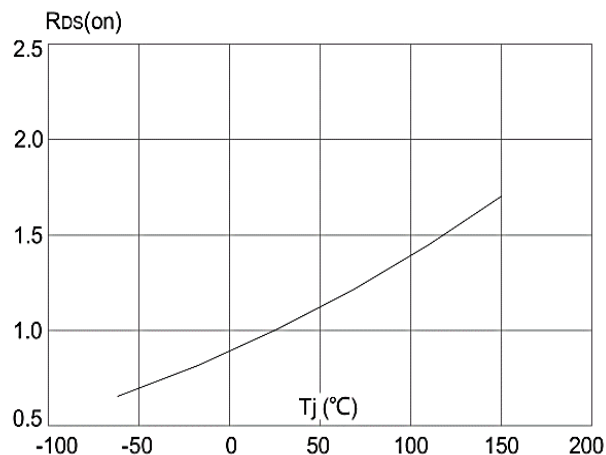


Figure 8: Normalized on Resistance vs. Junction Temperature

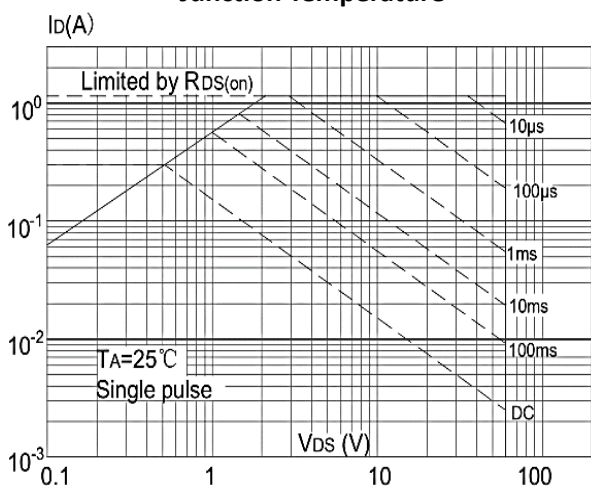


Figure 9: Maximum Safe Operating Area vs. Case Temperature

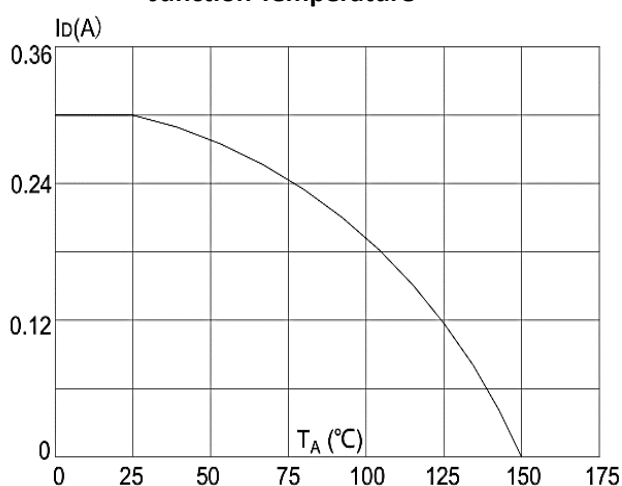


Figure 10: Maximum Continuous Drain Current

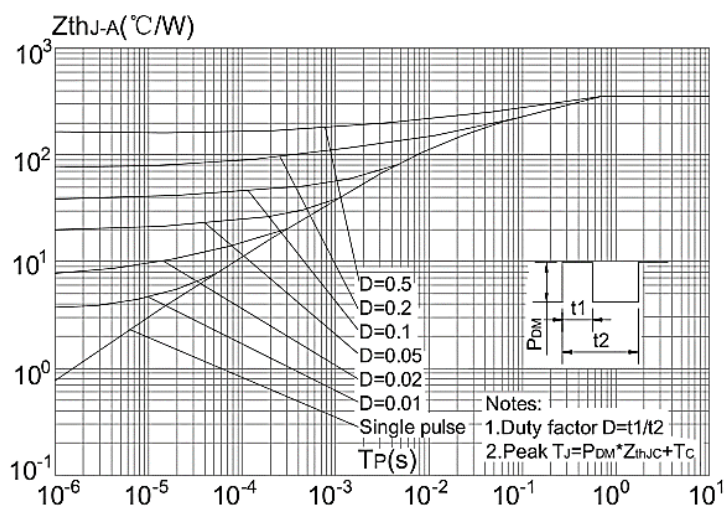
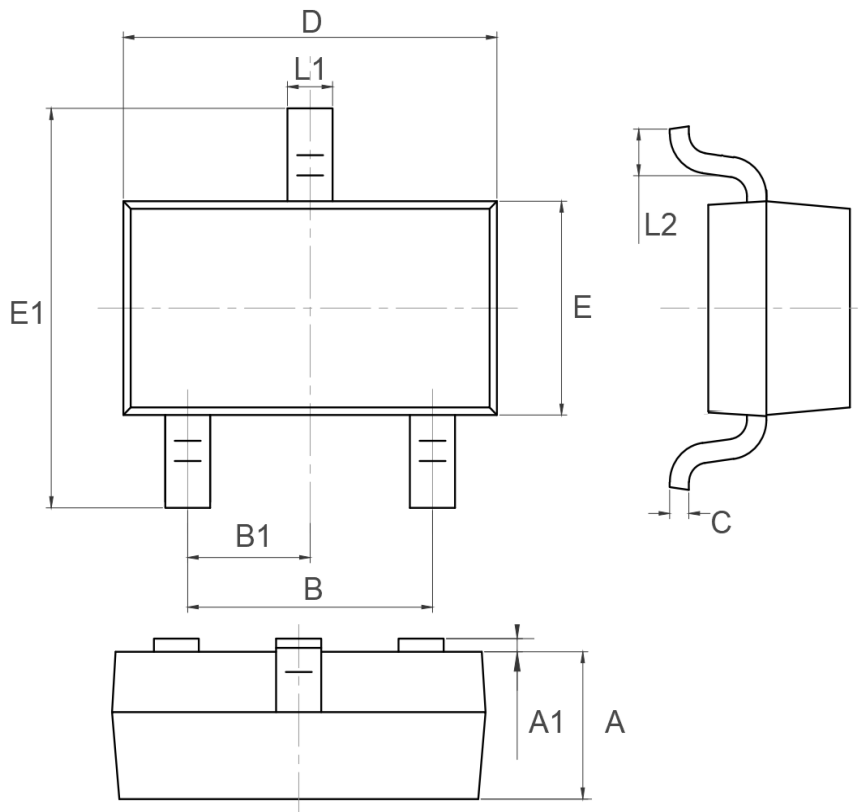


Figure.11: Maximum Effective Transient Thermal Impedance, Junction-to-Case

Package Mechanical Data-SOT23L



Symbol	Dimensions In Millimeters		
	min.	typ.	max.
A	0.90	1.00	1.10
A1	0.00	0.05	0.10
B	1.80	1.90	2.00
B1	0.95TYP		
C	0.08	0.115	0.15
D	2.80	2.90	3.00
E	1.20	1.30	1.40
E1	2.25	2.40	2.55
L1	0.30	0.40	0.50
L2	0.20	0.35	0.50

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Edition	Date	Change
REV1.0	2023/3/8	Initial release
REV1.1	2026/6/23	Update LOGO And Corrected Manual POD

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